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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/569,942	02/28/2006	Akihiko Endo	P29123	1077

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EXAMINER	
NIKMANESH, SEAHVOSH J	
ART UNIT	PAPER NUMBER
2812	

NOTIFICATION DATE	DELIVERY MODE
01/26/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/569,942	ENDO ET AL.	
	Examiner	Art Unit	
	SEAHVOSH J. NIKMANESH	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12/3/2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4,7 and 8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4,7 and 8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 November 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This is in response to the remarks and amendments filed 12/3/2008.

Response to Arguments

2. Applicant's arguments, see pages 5-8, filed 11/7/2008, with respect to claims 1-6 have been fully considered and are persuasive.

3. The rejection of claims 1-6, in the action filed 8/7/2008, has been withdrawn and a new rejection has been submitted herewith.

Drawings

4. The drawings were received on 111/7/2008. These drawings are acceptable.

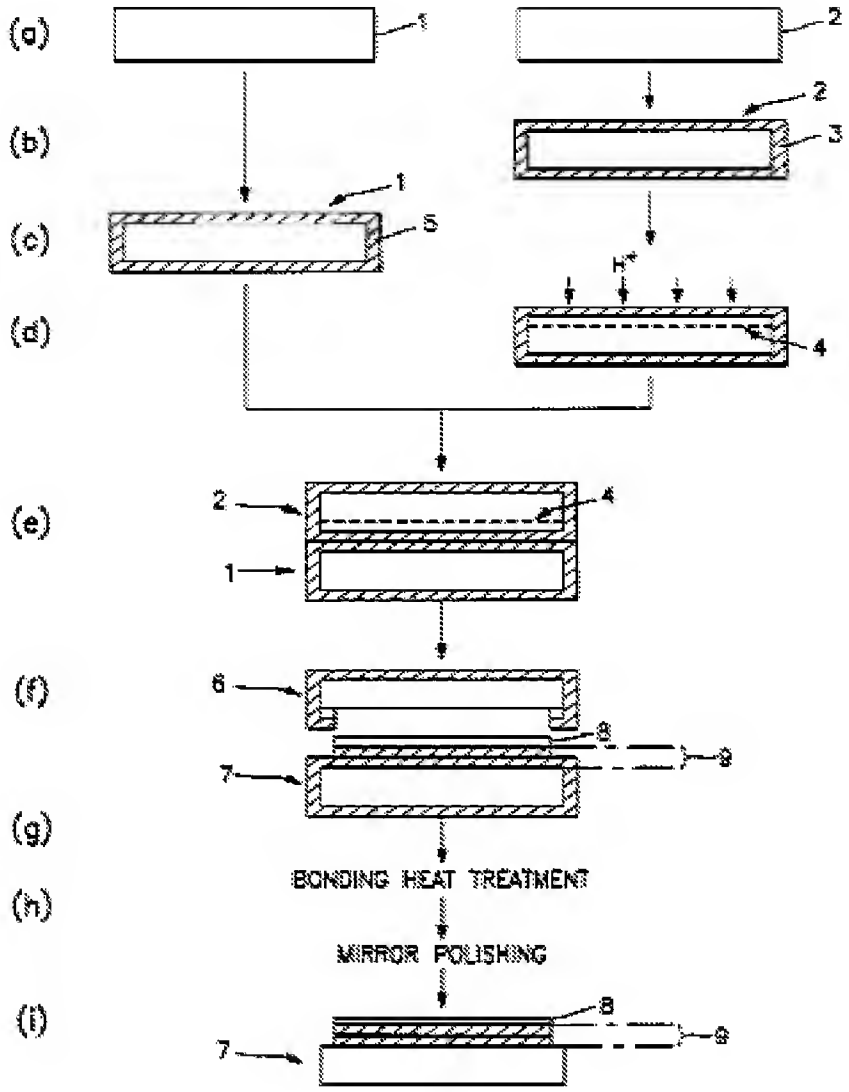
Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Mitani et al. US 6,245,645 B1.

FIG. 1



a. **Regarding claim 1,** Mitani et al. shows a method for manufacturing a bonded wafer, comprising the steps of:

ion-implanting of a light element into a wafer (2; step d; Column 6, lines 4-10; i.e. hydrogen ion or rare gas ion implantation) for active layer at a predetermined depth via an insulating film (3) that has been formed thereon to form an ion-implanted area (4) in said active layer wafer;

subsequently bonding (step e) said active layer wafer with a supporting wafer (1) having an insulating film formed thereon (5) together as their insulating films facing to each other to produce the bonded wafer (7); and

heat treating (step f) said bonded wafer to form bubbles (Column 6, lines 19-27) of said light element in said ion-implanted area and thereby induce a cleavage and separation of a part of said bonded wafer (8) defined in said ion-implanted side for forming an active layer wherein

the thickness of the oxide insulator is 50 nm and the thickness of the formed semiconductor layer is 400 nm (example 1).

Mitani et al. does not show that the thickness of said insulating film of said active layer wafer, tdox, satisfies the following formula:
tdox < (1/9) X tsoi, where tsoi = thickness of said active layer.

However, Mitani et al. discloses the same materials, ions, process steps, and features as the Applicant in the instant invention. These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ 2d 1685, 1688 (Fed Cir. 1996) (claimed ranges of a results effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA) (discovery of optimum value

of result effective variable in a know process is ordinarily within the skill of art) and In re Aller, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

Thus, it would have at least been obvious to one of ordinary skill in the art the time the invention was made to have used a tdox vs tsoi as specified in Mitani et al., with the motivation that the buried oxide can be formed having a desired thickness and still avoid the influence of the deviation in the thickness of the oxide film of the bond wafer on the thickness uniformity of the SOI layer (Column 3, lines 5-15). The combination can be met with a reasonable expectation for success since the claimed range is very near specified range in Mitani et al. and similar process steps are taken and similar materials are used.

b. **Regarding claim 7,** Mitani et al. shows that the thickness of said insulating film of said active layer is between 0.05 μm and 1.0 μm (Example 1).

7. Claims 3, 4, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Mitani et al. US 6,245,645 B1, as applied to claim 1, above, and further in view of Cheung et al. US 6,344,404 B1.

a. **Regarding claim 3,** MItani et al. teaches the method substantially as claimed in claim 1, above.

Mitani et al. does not explicitly shows that a plasma treatment is performed.

Cheung et al. teaches a method for manufacturing a bonded wafer in which said active layer wafer and said supporting wafer are subjected to a plasma treatment, respectively, before said bonding step of said active layer wafer with said supporting wafer (Column 5, lines 54-64).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have further used the plasma treatment as taught by Cheung et al. with the method of Mitani et al. with the motivation the plasma cleaning activates wafer surfaces for further bonding (Column 5, lines 54-63). The combination can be met with a reasonable expectation for success since it appears that the teaching of Cheung goes on to say that plasma activated surfaces bond well with oxide surfaces (Column 5, lines 54-63).

b. **Regarding claim 4,** MItani et al. teaches the method substantially as claimed in claim 1, above.

Mitani et al. does not explicitly shows that a plasma treatment is performed.

Cheung shows that plasma treatment is carried out in an atmosphere of oxygen gas or nitrogen gas by holding said wafers at a temperature of 400 °C or lower.

Cheung et al. does not show that the wafers are treated for ten seconds or longer.

However, it would have been obvious to one of ordinary skill in the art at the time the invention as made to have treated the semiconductor for over 10

seconds since plasma treatments require time to generate and sufficient time is needed for plasma to interact with the semiconductor materials. The examiner notes that no time window is explicitly stated by Cheung, however the specified gases of oxygen are disclosed for the purpose of plasma cleaning of the substrate surface (Column 5, lines 54-60) and the process would require sufficient time to activate the wafer surface. Also Cheung et al. discloses that when working with the ion implanted region it is crucial to keep the substrate processing temperatures between 20°C and 450°C in order to maintain bubble formation at the ion implanted region (Column 5, lines 15-30) prior to the wafer bonding and separation processes. It would have been obvious to one of ordinary skill in the art at the time the invention was made to further use the method of Cheung with the method Mitani et al., with the motivation the plasma cleaning activates wafer surfaces for further bonding (Column 5, lines 54-63). The combination can be met with a reasonable expectation for success since it appears that the teaching of Cheung goes on to say that plasma activated surfaces bond well with oxide surfaces (Column 5, lines 54-63) and to maintain bubble formation.

c. **Regarding claim 8,** Mitani et al. shows that the thickness of said insulating film of said active layer is between 0.05 μm and 1.0 μm (Example 1).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SEAHVOSH J. NIKMANESH whose telephone number is (571)270-1805. The examiner can normally be reached on Mon through Fri 7:30 - 5:00 E.S.T..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Garber can be reached on 571-272-2194. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Seahvosh J Nikmanesh/
Examiner, Art Unit 2812

/Alexander G. Ghyka/
Primary Examiner, Art Unit 2812